

# Game Design Patterns for Instructional Design and Research

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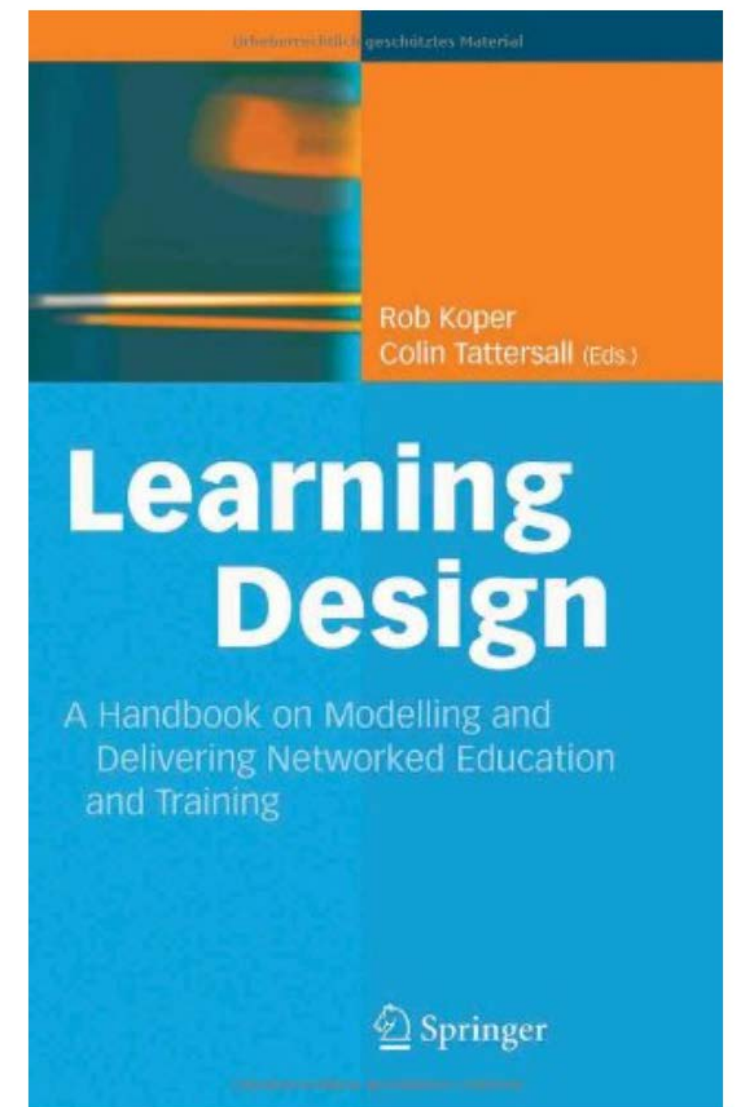
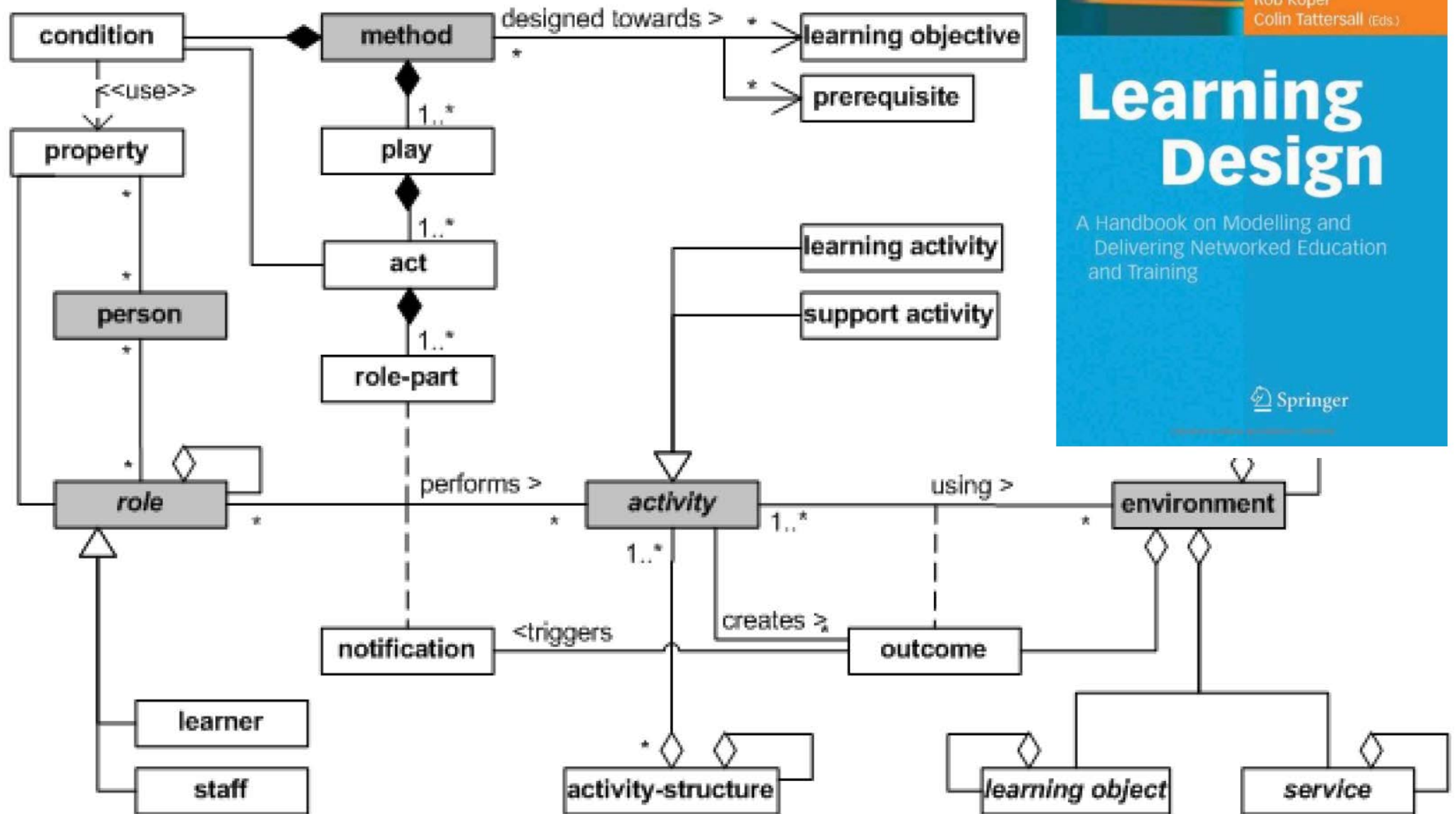
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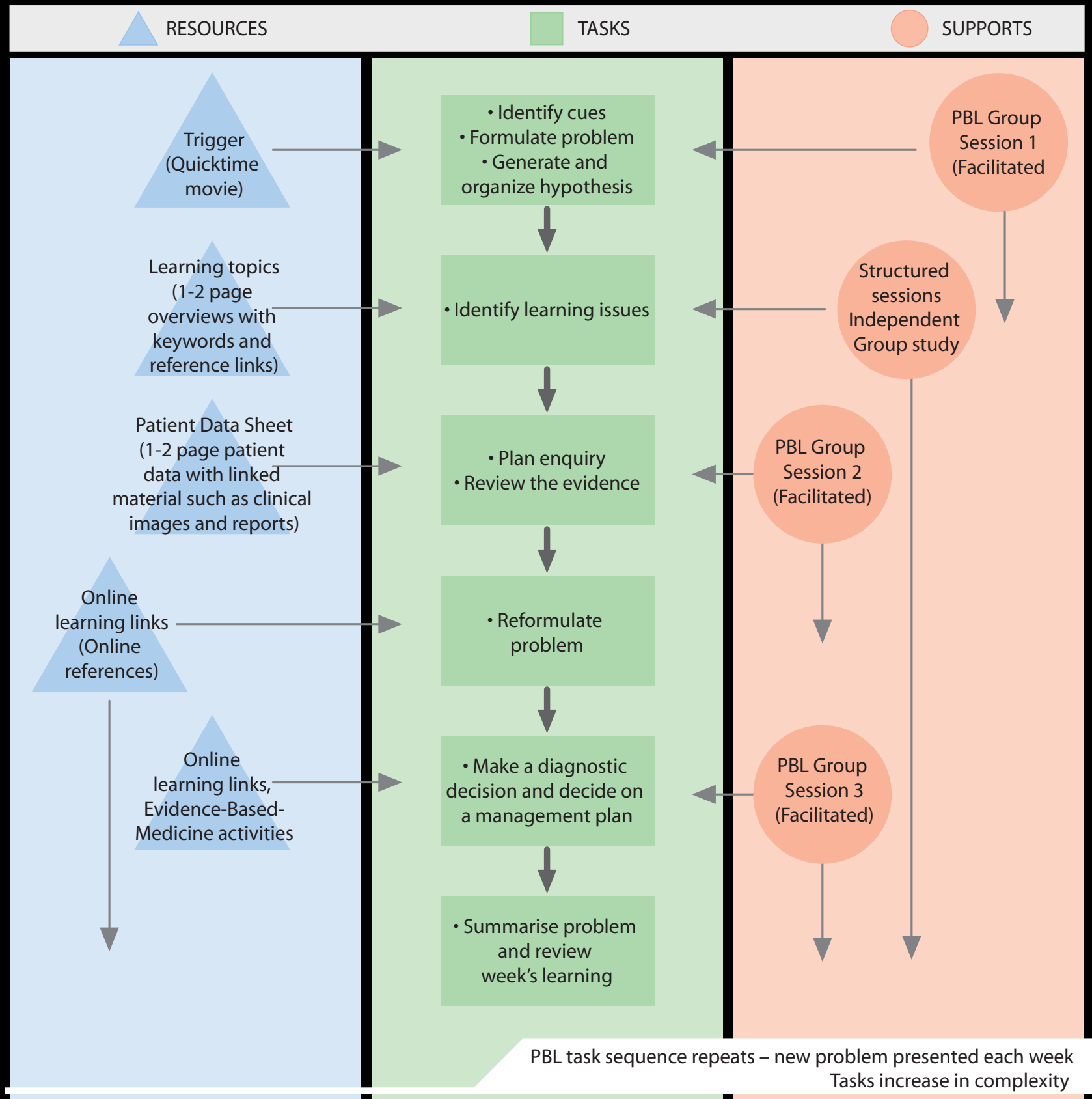




# #1 INSTRUCTIONAL DESIGN AND GAME DESIGN PATTERNS

# learning design





Best  
practice  
analysis,  
with simple  
metaphors

## Learning Design

Choose a template for your new Learning Design.



### Categories

Basic

Trainer-driven models

Discussion-oriented models

Collaborative assessment-driven models

Assessment-model driven

Adaptive-driven models



Socratic Questioning 1



Socratic Questioning 2



Inquiry Based Learning



One Minute Paper



liosaw



Think Pair Share 1

**Socratic Questioning 1:** Named for the early Greek philosopher and teacher Socrates, a Socratic approach is one in which the trainer poses thoughtful questions to help learners learn.

During Socratic questioning, the trainer models critical thinking who respects learners' viewpoints, probes their understanding, and shows genuine interest in their thinking. The trainer poses questions that are more meaningful than those a novice of a given topic might develop on his or her own. The trainer creates and sustains an intellectually stimulating training environment (Merritts and Walter, 2008).

# Templates for Educators



[View all members](#)

ethics, fair, honest, harm, consequences, prevention

# PLEs and Widget Learning Activity

# #2 GAME DESIGN PATTERNS

# PATTERNS *in* GAME DESIGN

*"Patterns in Game Design is that rare sort of book on game design: a useful one. Readers will find their understanding of games, and designers their toolbox, expanded by exposure to a wide variety of game design techniques, some of*



**Table 2.1.:** Overview of game design pattern categories

Pattern Category	Description
1 Game Elements Patterns	These patterns describe game objects that define the area of the game reality or that players can manipulate. (48 patterns) (for example: clues)
2 Patterns for Resources and Resource Management	These patterns describe different types of resources that can be controlled by the players and the game system. (20 patterns) (for example: resources)
3 Patterns for Information, Communication and Presentation	These patterns describe how information about the game state is treated, for instance hiding of specific information or for carrying out evaluations. (20 patterns) (for example: asymmetric information)
4 Actions and Events Patterns	These patterns govern what kinds of actions are available to players, how they relate to changes in the game state, and how they relate to the goals of the players. (44 patterns) (for example: rewards or penalties)
5 Patterns for Narrative Structures, Predictability and Immersion	These patterns deal with storyline, immersion and commitment to the game by the players. (31 patterns) (for example: surprises)

how can we  
use powerful  
game  
patterns in  
designing  
educational  
artefacts ?



**Table 2.3.:** Mapping of “Preparation” learning functions onto game design patterns

Learning Functions	Func-	Underlying taxonomy elements	Game Design Pattern (class)
Prior Knowledge Activation		Gagné’s instructional event of “retrieval” (stimulating recall of prior learning).	Goals patterns, e.g. Reconnaissance (7,18,1)
Motivation		Chiefly, Keller’s ARCS model is of relevance here.	Various patterns, mostly score related, for example rewards (4,54,1).
Attention		Both Keller and Gagné list Attention.	Game elements patterns, e.g. Surprises (5,30,16), Clues (1,19,3)
Expectation		Gagné’s instructional event of “expectancy” (informing learners of the objective).	Goal related patterns, e.g. Pre-defined Goals (8,10,2), Narrative patterns e.g. Anticipation (5,22,2)

# Mapping game patterns onto pedagogical design patterns

Course: Dominique's Course - Mozilla Firefox

File Edit View History Delicious Bookmarks Tools Help

**Dominique's Course** Location: Time spent on course: 01:32:11 You are logged in as [Christian Glahn](#) (Logout)

**Moodle1** ▶ DV101 Switch role to... Turn editing on

**Activities**

- Assignments
- Choices
- Forums
- Quizzes
- Stoodle Modules

**People**

- Participants

**Search Forums**

Go

[Advanced search](#)

**Administration**

**Course categories**

- Main
- Testing
- All courses ...

**GISMO**

**Topic outline**

On this forum, you are requested to post at least two questions arising from your reading of the resources. All questions will be answered by the instructor.

[News forum](#)

**1** Five Usability Principles in Web Design - COURSE MATERIAL

- [How is the course organized and which actions are required for learning?](#)
- [Which benefits will I get from this course?](#)
- [How shall I be assessed?](#)
- [Resource 1](#)
- [Resource 2](#)
- [Resource 3](#)
- [Resource 4](#)
- [Resource 5](#)
- [Resource 6](#)
- [Resource 7](#)
- [Resource 8](#)
- [Resource 9](#)

**Indicators**

Your Actions

Peer Actions

**Latest News**

**Upcoming Events**

**Recent Activity**


Activity since Wednesday, 17 June 2009, 12:53 PM

[Full report of recent activity...](#)

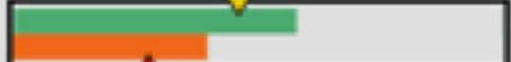
Nothing new since your last login

# Reflection Amplifiers




▼ **activity** 

▼ **tags** ComputerGames **ComputerHistory**  
 ComputerScience Demos Design Flash **Flow**  
*FutureTechnologies* GameBasedLearning  
**GraphicDesign** GUI HCI Journals JSON  
**LearningTechnology** Literature LSA Mace  
 MMURPG MobileLearning OpenSource **Perl**  
 SOAP SocialSoftware  
**TENCompetence** Usability  
 Visualisation Web WebAnimation  
**WebApplications** WebDesign XML XUL

▼ **activity** 

▼ **tags** ComputerGames ComputerHistory  
 ComputerScience Demos Design Flash  
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 GraphicDesign GUI HCI Journals JSON  
 LearningTechnology Literature LSA Mace MMURPG  
 MobileLearning OpenSource SOAP SocialSoftware  
 TENCompetence Usability Visualisation Web  
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▼ **activity** 

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 WebAnimation WebApplications WebDesign XML  
 XUL

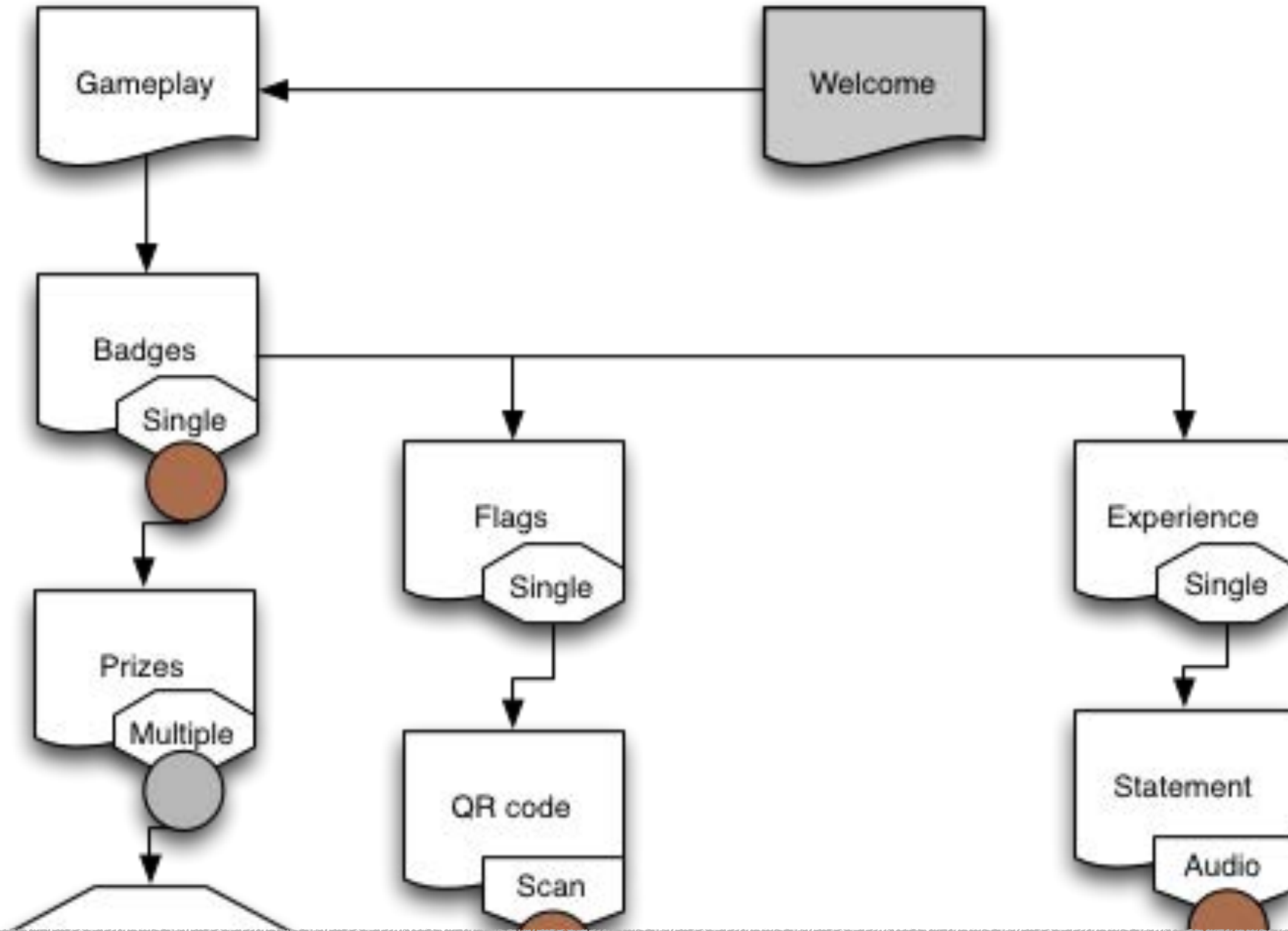


context indicators ...

**Information**

**Action**

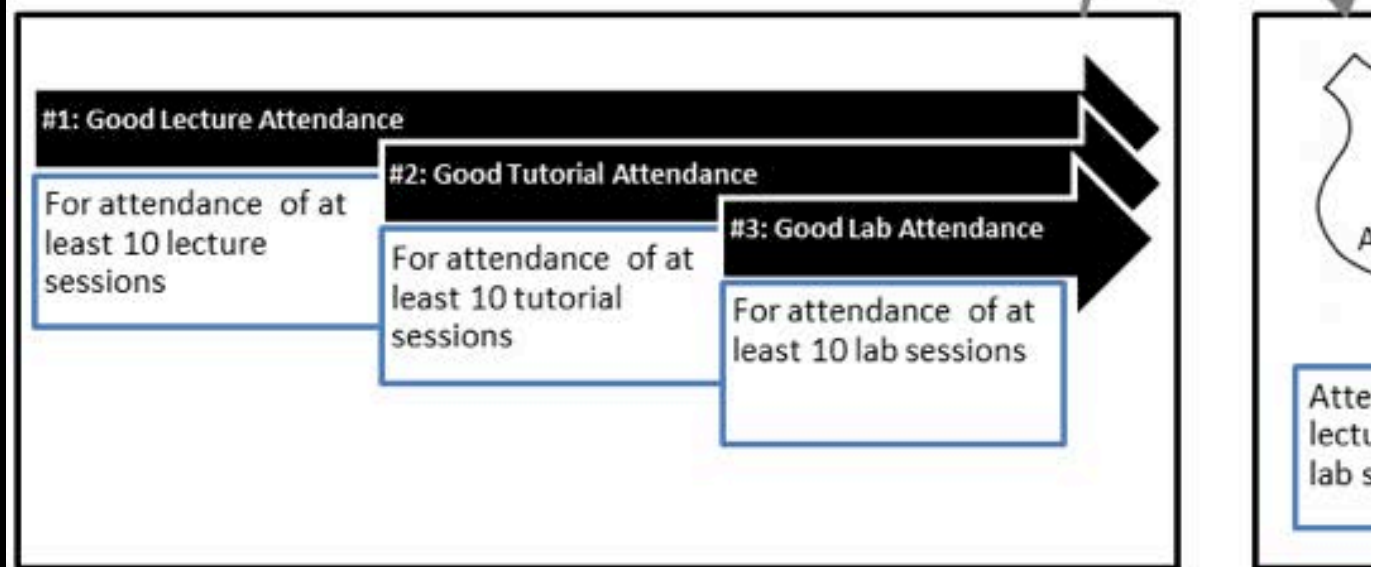
**Challenge**



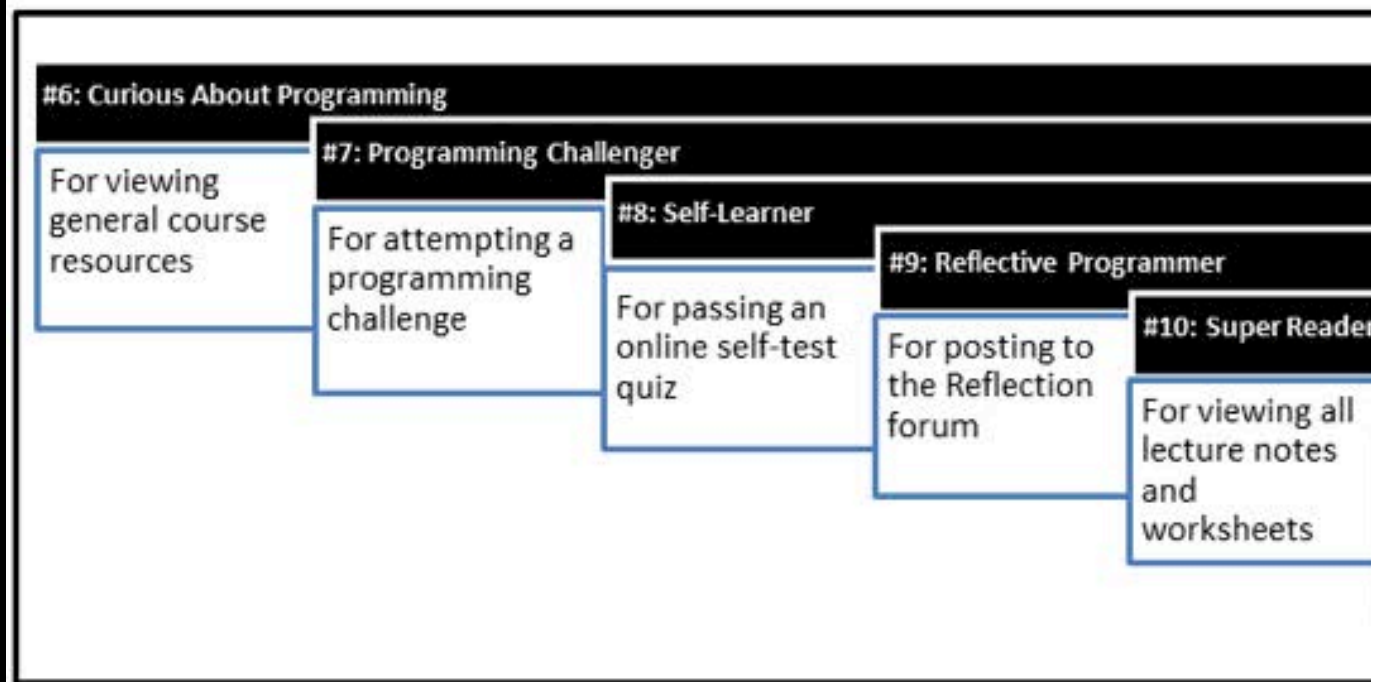
# Learning Activities and Badges



## ATTENDANCE



## PARTICIPATION



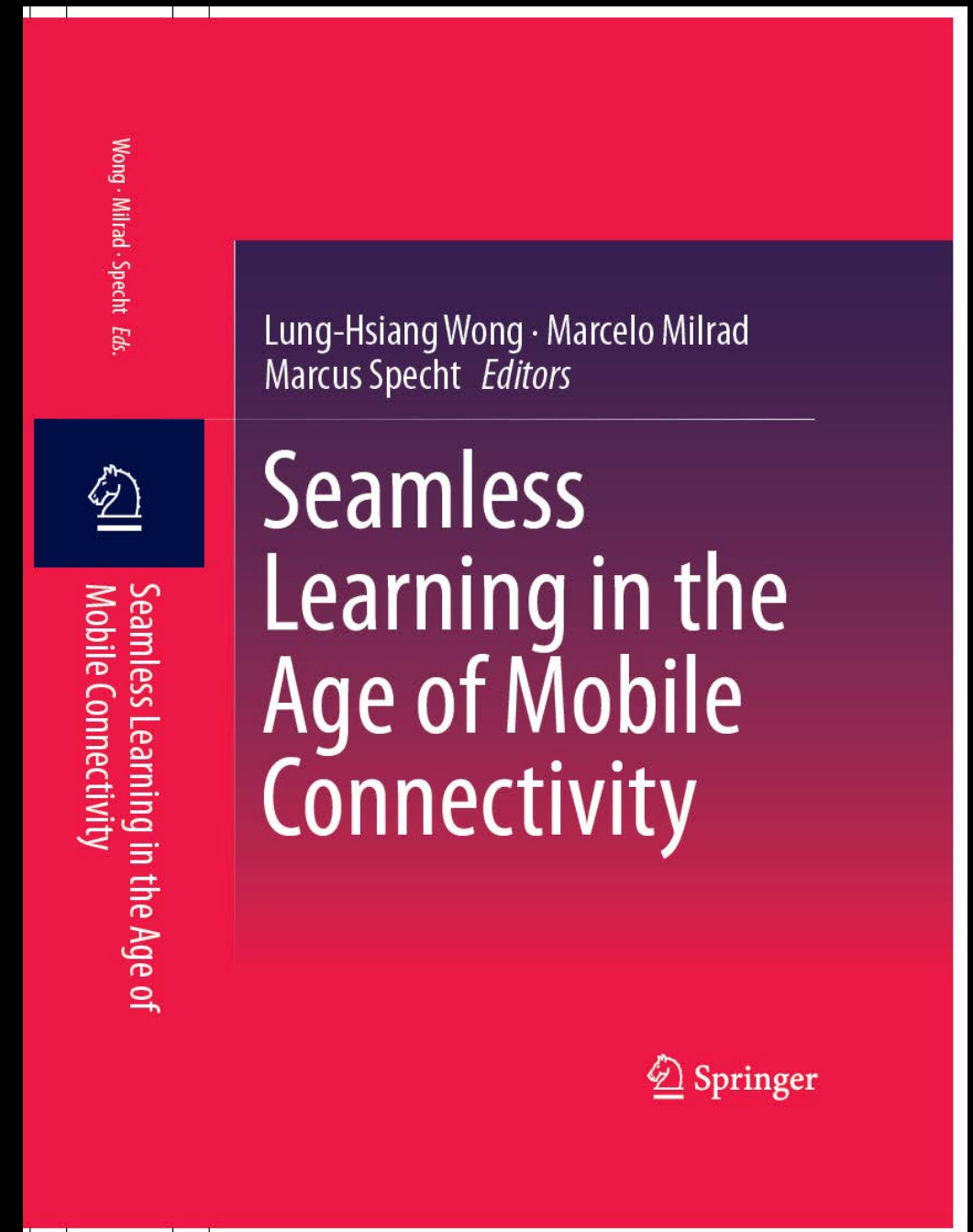
## FLOWCHART



Participation		*Little Adventurer
		Super Adventurer
		Challenger
		Super Challenger
		Self-Learner
		Master-Learner
		Reflective Programmer
		Shining Star

badge design for effect

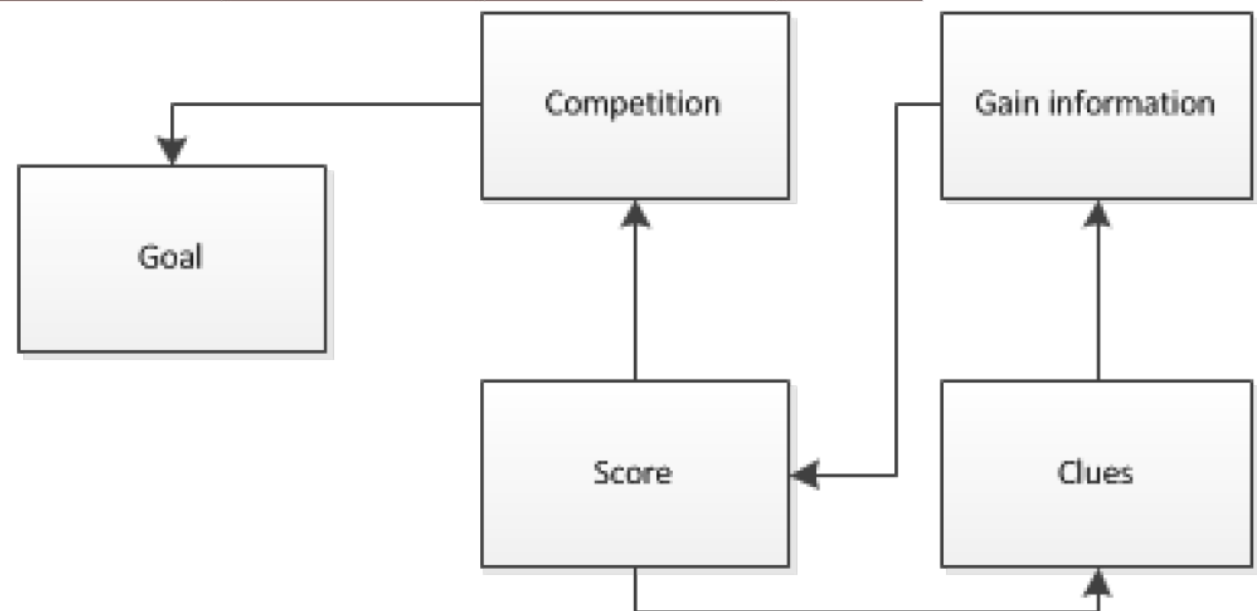
# #3 GAMIFICATION IN SEAMLESS LEARNING





Powered by Kap IT

Kamakshi Rajagopal	Cristina Costa	Sebastian Kelle	Maria Perifanou	Wolfgang Reinhardt	Maren Scheffel	Birgit Schmitz	Rory Sie
Mayra F. Angeles Sánchez	Skevi Demetriou	Michael Kohlegger	Hans Põldoja	Carl Smith	Corné Verbruggen	Joe Corneli	Marcus Specht
Dirk Börner	Angela Fessl	Panos Kolivanis	Yaroslav Porshnev	Xiaohong Tan	Peter Sloep	Scott Wilson	Marie Joubert
Dimo Boyadzhiev	Sibren Fetter	Mike Mimirinis	Elena Railean	Behnam Taraghi	Dai Griffiths	Barbara Kieslinger	Stefan Proell
				Thomas Ullmann	Jon Dron	Henning Eriksson	



# Mister X UbiLearn Game

## Information

## Action

## Challenge

Gameplay

Welcome

Badges

Single

Prizes

Multiple

Quiz

Flags

Single

QR code

Scan

Second Floor

142 occupants

7,764

Kilowatt-hours

26%

PERFORMANCE NOW

900

750

600

450

300

150

0

1

3

5

7

9

11

13

15

17

19

21

23

25

27

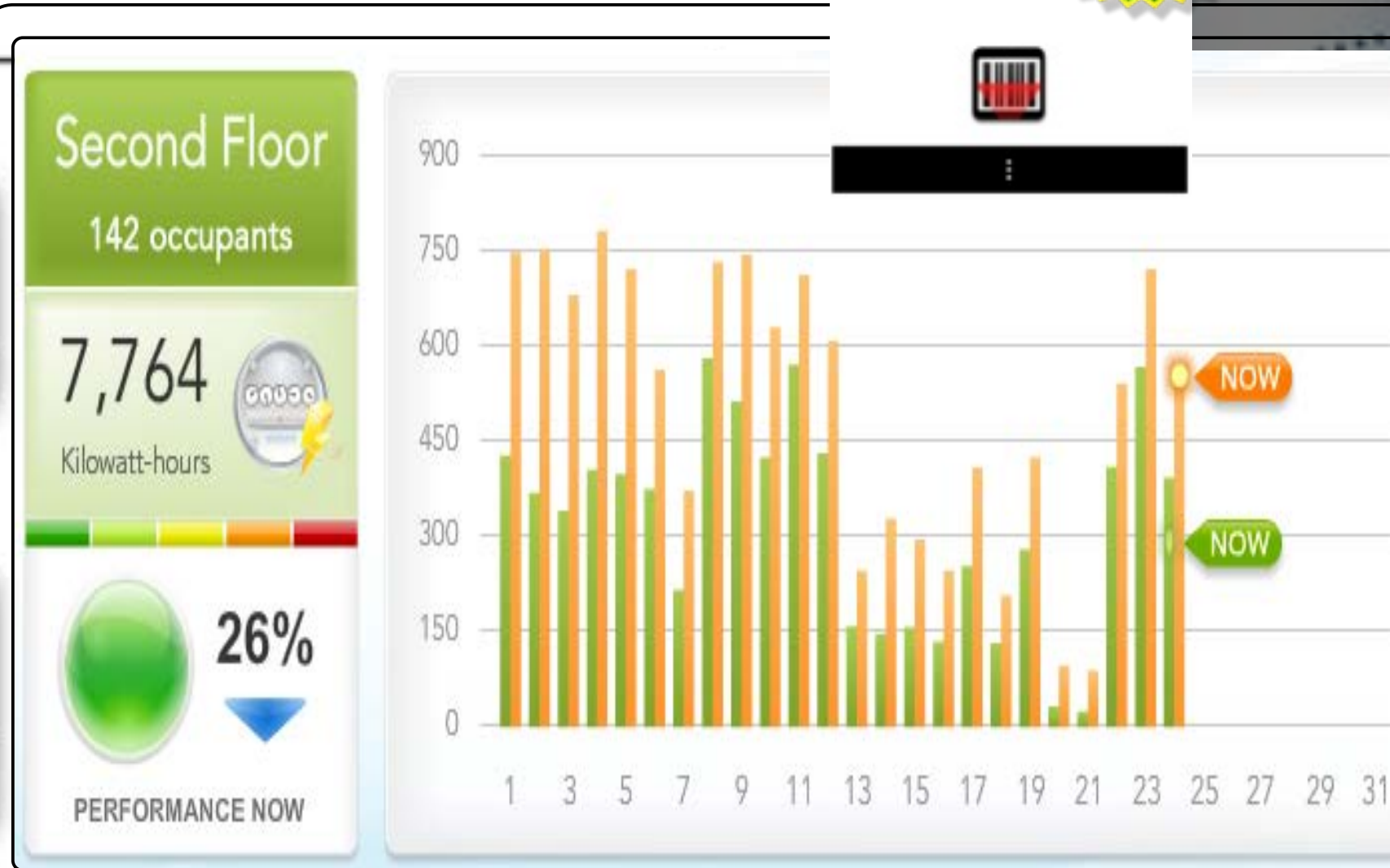
29

31

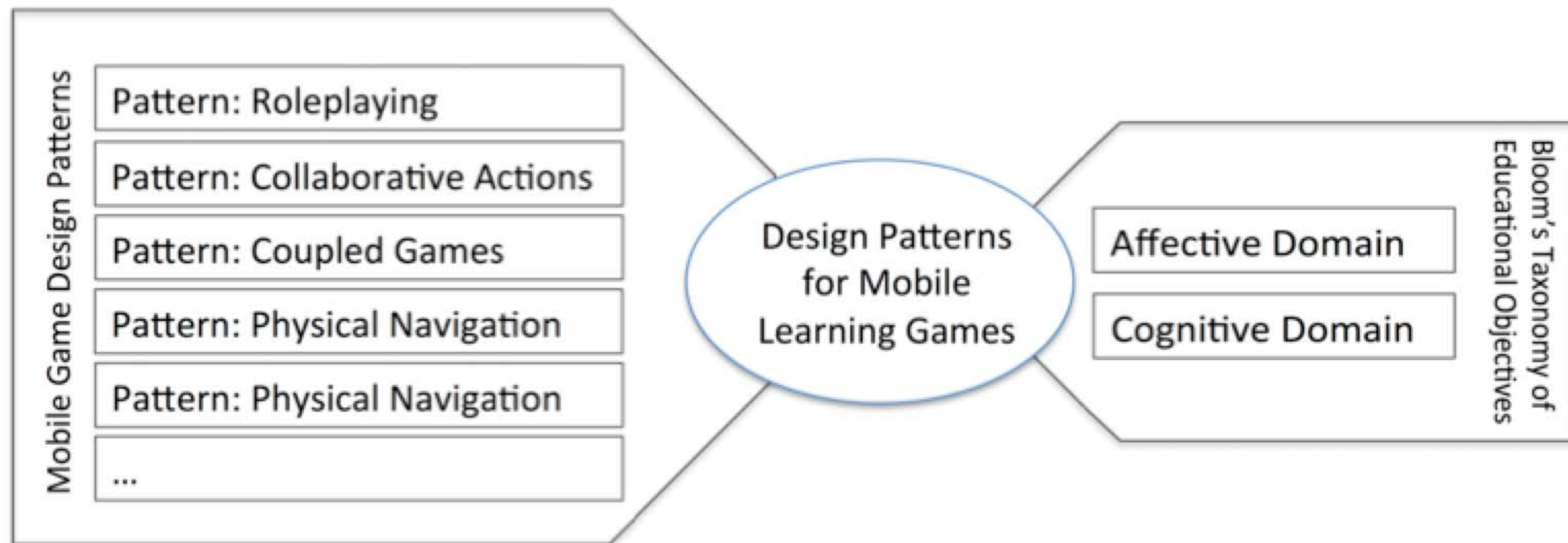
NOW

NOW

Workplace





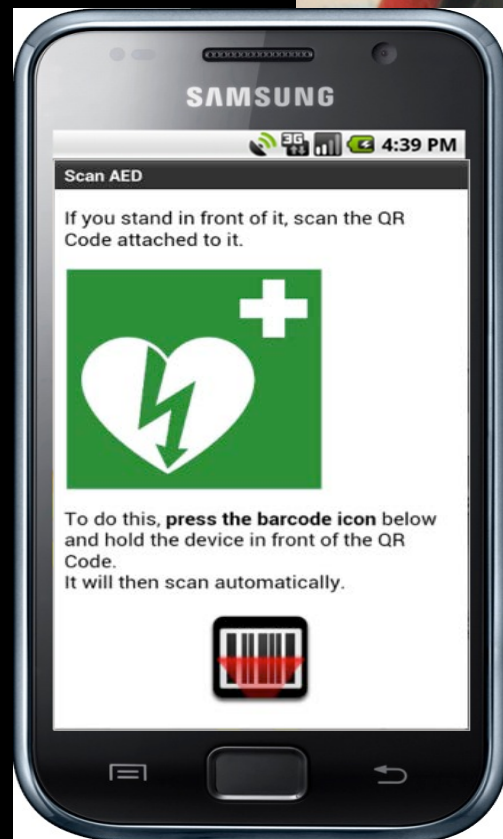


Schmitz, B., Klemke, R., & Specht, M. (2012). Effects of mobile gaming patterns on learning outcomes: A literature review. *International Journal of Technology Enhanced Learning*, 4(5-6), 345-358. doi: 10.1504/IJTEL.2012.051817  
URI: <http://hdl.handle.net/1820/5197>



Coupled Games are a powerful concept ...





Physical Learning Activities  
Connected in a Mobile Learning  
script on a phone ...



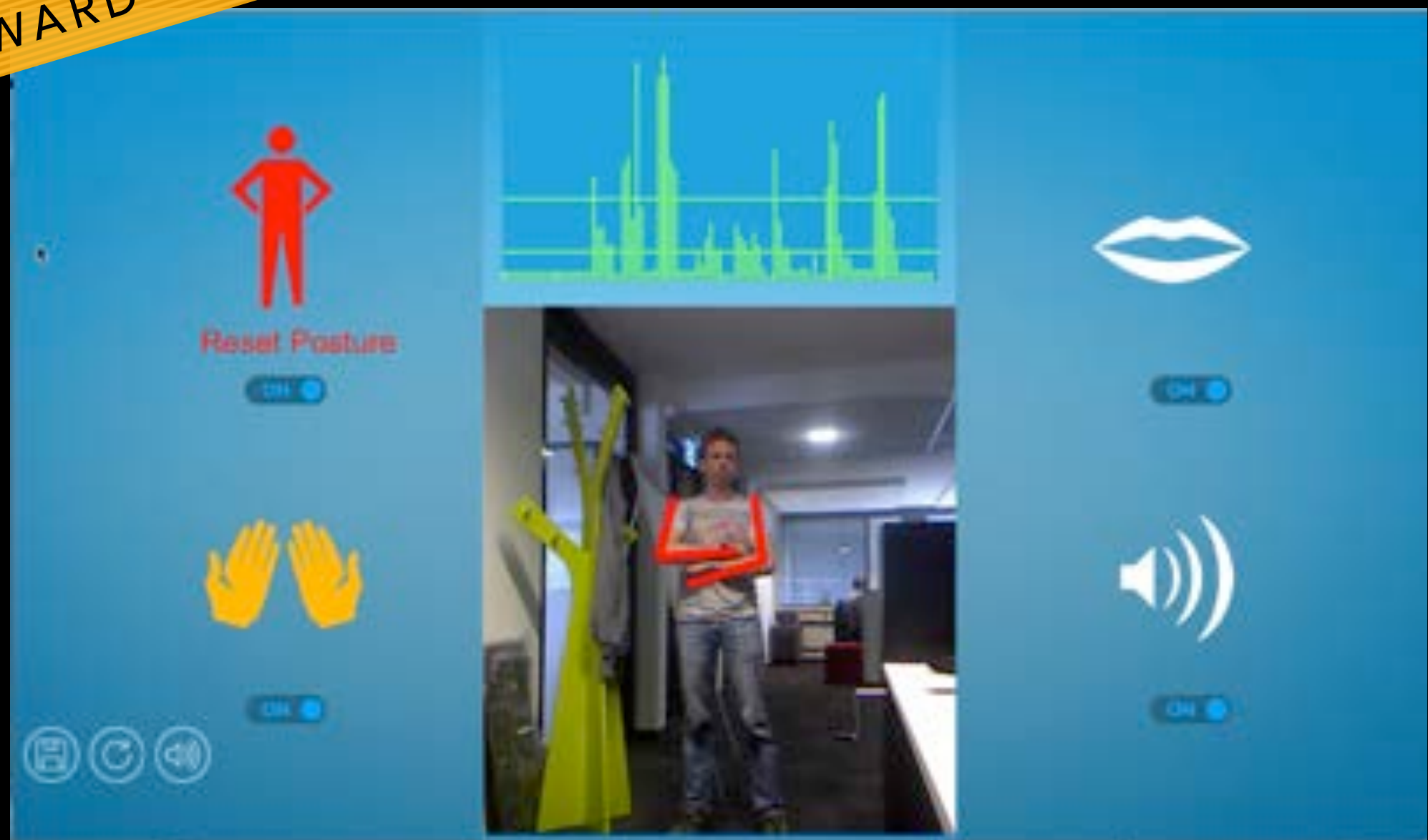
# attention-aware displays ...



- raise and retain attention significantly better.
- lead **not** to higher cognitive load but to a significant higher knowledge gain.

# PRESENTATION TRAINER

BEST DEMO AWARD - ECTEL 2014



LESSONS LEARNED



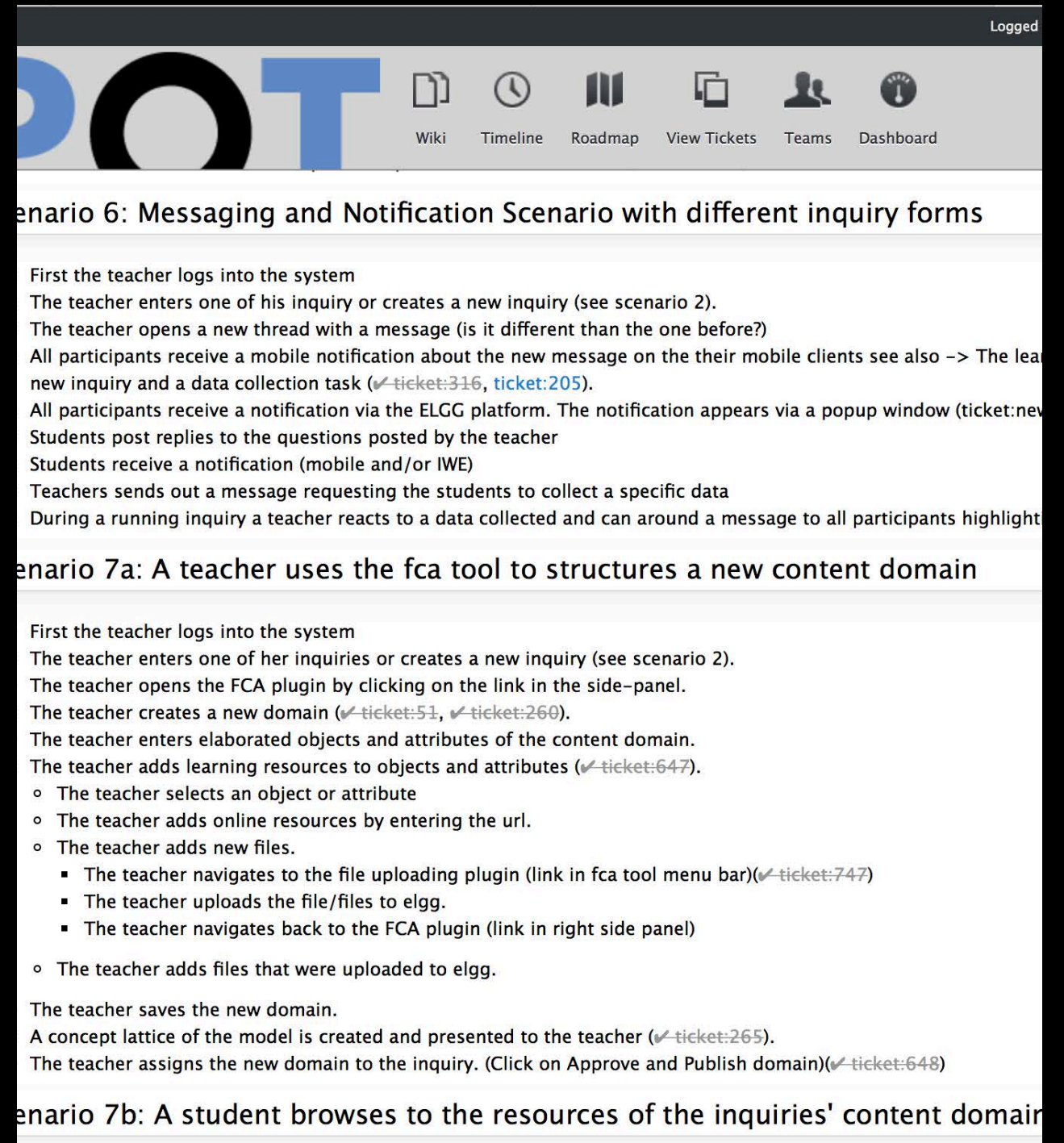
# LESSONS LEARNED

- Game Design Patterns have powerful effects on motivation, engagement, learning outcomes, and secondary variables
- Multiple Design Options: you need to adapt the implementation of a pattern to your context but can integrate them in Standard Learning Facilities
- Specific Patterns support specific phases in learning and instructional process in principle they are always "help to get you started".

# #4 RESEARCH METHODOLOGY

# DEVELOP YOUR TECHNOLOGY AGILE .. FOR BUILDING A COMMON GROUND WITH YOUR "CLIENTS"

user scenarios, early  
prototypes, early user  
feedback, foster  
communication  
between developers,  
end users and  
managers



The screenshot displays a web application interface with a top navigation bar. The bar includes a logo on the left and several icons with labels: Wiki, Timeline, Roadmap, View Tickets, Teams, and Dashboard. The main content area is divided into sections for different user scenarios.

Scenario 6: Messaging and Notification Scenario with different inquiry forms

First the teacher logs into the system  
The teacher enters one of his inquiry or creates a new inquiry (see scenario 2).  
The teacher opens a new thread with a message (is it different than the one before?)  
All participants receive a mobile notification about the new message on the their mobile clients see also -> The lea  
new inquiry and a data collection task (✓ticket:316, ticket:205).  
All participants receive a notification via the ELGG platform. The notification appears via a popup window (ticket:nev  
Students post replies to the questions posted by the teacher  
Students receive a notification (mobile and/or IWE)  
Teachers sends out a message requesting the students to collect a specific data  
During a running inquiry a teacher reacts to a data collected and can around a message to all participants highlight

Scenario 7a: A teacher uses the fca tool to structures a new content domain

First the teacher logs into the system  
The teacher enters one of her inquiries or creates a new inquiry (see scenario 2).  
The teacher opens the FCA plugin by clicking on the link in the side-panel.  
The teacher creates a new domain (✓ticket:51, ✓ticket:260).  
The teacher enters elaborated objects and attributes of the content domain.  
The teacher adds learning resources to objects and attributes (✓ticket:647).

- The teacher selects an object or attribute
- The teacher adds online resources by entering the url.
- The teacher adds new files.
  - The teacher navigates to the file uploading plugin (link in fca tool menu bar)(✓ticket:747)
  - The teacher uploads the file/files to elgg.
  - The teacher navigates back to the FCA plugin (link in right side panel)
- The teacher adds files that were uploaded to elgg.

The teacher saves the new domain.  
A concept lattice of the model is created and presented to the teacher (✓ticket:265).  
The teacher assigns the new domain to the inquiry. (Click on Approve and Publish domain)(✓ticket:648)

Scenario 7b: A student browses to the resources of the inquiries' content domain



ADOPTION OF INNOVATION IS CRITICAL ...

# LAYERED ADOPTION



le ouders... Agora Amazing Afternoons Media Q&A Leerlingen aanmelden Contact

## Aan alle ouders...

Uw kind zit in groep 8 en uw zoon of dochter is rond de 11,12 jaar. Normaal gesproken be-  
treedt in Nederland iemand rond zijn 25ste de arbeidsmarkt. Dat betekent dat uw kind de  
verdubbeling van zijn huidige leven nog op school zal zitten! In 2025 neemt uw zoon of  
dochter de stap om in de maatschappij te gaan werken.

Wij, maar ook anderen (wetenschappers, maar iedereen met gezond verstand) weten dat  
we één ding weten, dat is dat we slechts bij benadering kunnen bedenken hoe die wereld  
in 2025 eruit zal zien. Door de snelheid van de technologische ontwikkelingen zal dit ons  
voorstellingsvermogen te boven gaan. Als wij u in 2000 verteld hadden dat leerlingen in  
2013 zouden leren met een iPad als hulpmiddel, dat zijverbonden met elkaar via een inter-  
net en communicerend met mobiele telefoons op zakformaat zouden leren, had u zich  
daar op dat moment dan een concrete voorstelling van kunnen maken?

Stichting Onderwijs Midden Lim-  
burg

soml

Key Partner

Open Universiteit

## Spelregels

Wanneer u uw kind aan de school geeft, wordt u de verantwoordelijkheid van de school overgenomen. Het is belangrijk dat u de school hiervan in kennis stelt. Het is ook belangrijk dat u de school hiervan in kennis stelt. Het is ook belangrijk dat u de school hiervan in kennis stelt.

Verder is er een lijst met spelregels.



ANALYSE THE CONTEXT WELL ...

# DESIGN-BASED RESEARCH





MEASURE THE RIGHT THING A TIME ...

# ALIGN WITH DEV. LIFE-CYCLE

Development Lifecycle	Evaluation aspect / Variables	<i>Evaluation Phase</i>
Design phase (no system)	<u>Requirements</u> Domain Model	Phase A: <u>Conceptual Evaluation</u>
Low-fidelity prototype ( <u>mockup</u> )	Usability Usefulness	Phase B: Qualitative and <u>formative</u>
High-fidelity prototype (running components)	<u>Usability</u> Measurement <u>Effectiveness</u>	Phase C: Quantitative and <u>formative</u>
Fully integrated system	Measurement <u>Effectiveness</u>	Phase D: Quantitative and <u>summative</u>



# Experimental Designs ...



- raise and retain attention significantly better.
- lead **not** to higher cognitive load but to a significant higher knowledge gain.

HIDDEN VARIABLES CAN BE MORE IMPORTANT ...

# TEL IN MULTI-VARIATE CONTEXT

